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Bubble boy

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Bubble Boy

by

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School of Film and Animation

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Abstract

Love is always unpredictable, especially for those who don't believe this. The story happens in an anti-physics universe, everyone lives in a separate planet. A lonely boy tried different ways to get a girl's attention. He truly believed the girl would notice him.

"Bubble Boy" is a three-minute thesis animation. It is a 3D animation that was mostly produced in MAYA 2012.

This paper delineates the whole process of making this animation, from the early stage till the final. It describes my innovations, obstacles, effort, sadness and happiness in this entire production.

Acknowledgements

I'd like to thank my two advisors, Bob Deaver and Atia Quadri first. Bob Deaver is a great and patient instructor, he was a great support who kept my motivation high and criticized me when it was necessary.

When it came to the final Quarter I met Atia and she became my advisor (Since Bob left RIT). She is a very intellectual person with great knowledge and experience in CG industry. She helped me to make a fully detailed plan sheet, which made it much easier to keep the schedule and be able to finish the project on time.

Also, I would like to express my appreciation to my thesis committee Mark Reisch and Brian Larson. They offered me so many invaluable suggestions and feedback.

Thanks for Wanru Liu. She helped me a lot to model the boy and girl's room decorations and set up linear workflow/ lighting for my animation.

Thanks for Tianshu Liu, who helped me to texture the boy's cloth and skin.

Thanks for Xiaoyu Liu, who made all the smoke, explosion and sparks for my film.

Thanks for Lucas. He did a wonderful job composing the music.

Last but not least I want to thank my family, without their love and financial support I would never finish my study abroad.

Introduction

The creation of graduate thesis film “Bubble Boy” began in March 2011 and lasted till Oct 2012 as a final project within MFA animation program at the School of Film and Animation of Rochester Institute of Technology. My work was arranged under supervision of my thesis committee members Bob Deaver, Atia Quadri, Mark Reisch and Brian Larson. The whole process consisted of preproduction: story development, concept design, character, storyboards and animatic; production: modeling, shading, texturing, rigging, lighting, animation, VFX, rendering; and postproduction: compositing, color correction, credits, sound and music design.

Part One: Pre-production

1) Story development

Story is always the most important thing for an animation. I started to think on early stage by watching lots of short animations and films. One that inspired me a lot is Kunio Kato(Japanese animator)'s *La Maison en Petits Cubes*. It was such a beautiful and emotional movie that always made me cry. I was interested to make something represented life journey in a surrealistic way. That was how the "ladder" story came out.

"Ladder" was my first idea, which supposed to be a symbolic film that indicates our life circle is just like climbing a long ladder. Sometimes we try to get something on the higher level of the ladder; sometimes we are confused about our position and why we need to keep climbing; sometimes we just get tired of such a tedious process. The main character would be climbing ladders from the childhood to his death. During the process he encountered different life moments (play, study, work, marriage, etc.) as well as observed others' life.

I propose "Ladder" in the spring quarter 2011 and got passed. But things got changed after spring. While I was doing some tests, I found it was hard and unconventional to mimic surrealistic style using 3D. And furthermore, this story was too sad that I wasn't happy to make it anymore.

I watched a Chinese animator's work *The Big Girl*, which told a simple funny story about how a little girl fights with a monster to save her beloved boyfriend. It really inspired me. Love is always unpredictable and makes people do crazy things. Based on that, I designed my main character as a smart little boy who falls in love on his first sight with a little girl who lives on another planet. He tried different ways to get her attention.

I couldn't figure out the ending for the story until one of my friends gave me the idea to make their sizes different. Since the boy can only see the girl from the telescope, he simply believes the girl is the same size as him. This will be a great surprise at the end for the audience. I really think it is the punch line for the story.

2) Concepts

In the animation production, concept design is the stage that conveys a visual representation of the character, background, sets and props. It is really important because it will determine the final image style for the animation. I began on July 2011 and moved into storyboards and layouts stage in October.

Character Design

Character design can be a tricky beast to tackle, because although many of the classic characters familiar to us all through cartoons, entertainment and advertising look simple, that simplicity usually belies the many hours of work that have gone into their development.

The story set me up with three characters: a boy, a girl and a bird. Before I actually designed them I did tons of research. I always respected Disney's realistic style of characters whose personality comes through design and movement.

On the other hand, I thought about their personalities. The main character, the boy, should be naïve, lonely, innovative, and yet a little bit goofy sometimes. The girl is a little princess, cute, sensitive and introverted. The bird is innocent, sleepy, and cynical.

As a result, I saw my final characters fitting most characteristics I initially wanted. Yet it still lacked visual impact. I wanted it to be stronger and more interesting in a visual sense to get people's attention. Specifically for it to be more exaggerated in terms of proportion, overall shape and color range.

Environment Design

When came to the environment design stage, I had to think about where and when is the story happening. I created this lonely 'universe' with stars, nebulas and

bubbles. Everyone lives in his or her own bubble. Although I call it a 'universe' here, it really isn't like the universe as we know it. Considering my plot, I had to make this world special. Birds and blimps can fly in it so it is not vacuous, and there must also be gravity. Despite these 'bugs', I made sketches in my sketchbook. Later I used them as a reference and drew the concept in Photoshop.

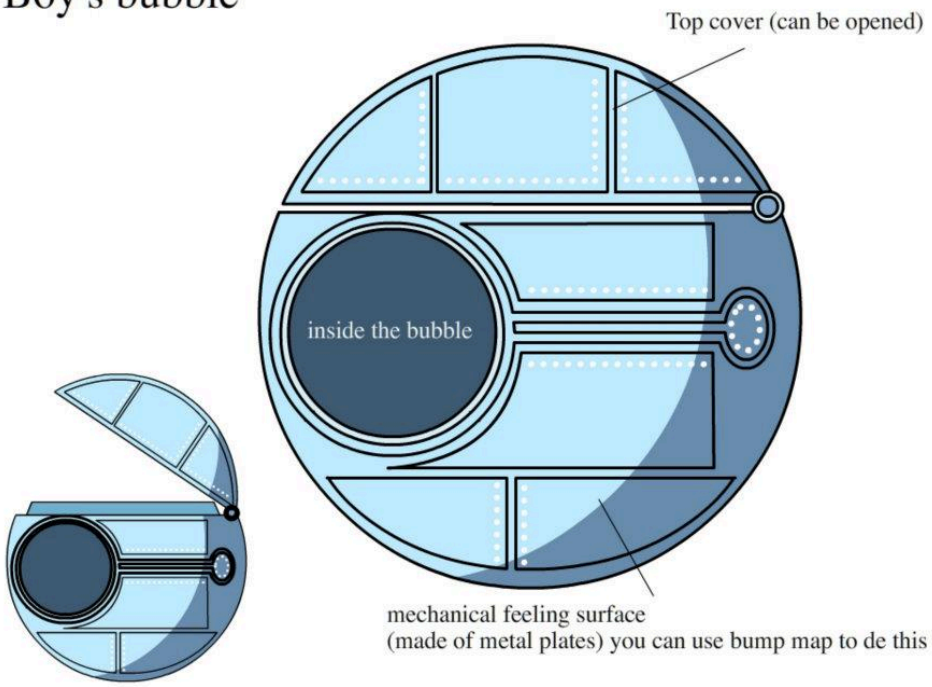
The boy's place is a blue bubble, which looks like a sphere made by pieces of metal. Inside it there are furniture, and since the boy is an inventor I designed some sci-fi style props and tools.

The little girl is cute and clean. So I made her room like a princess room, red and pink were the main colors of the décor.

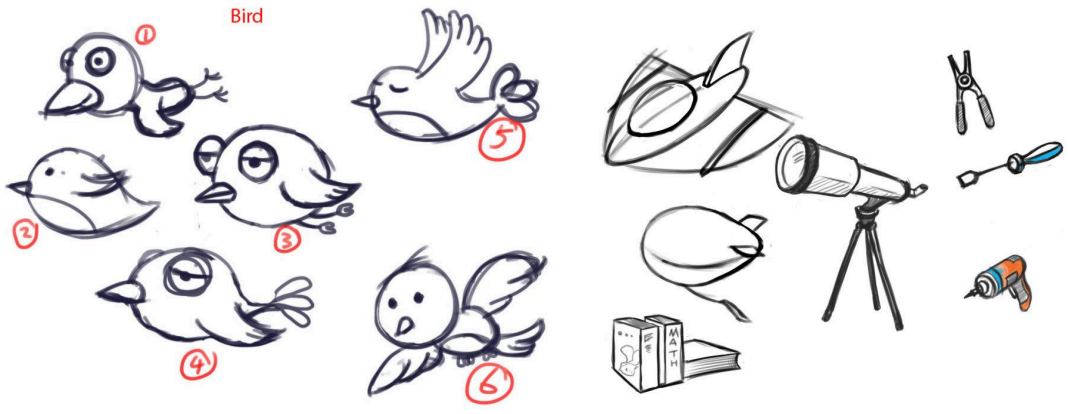
Props Design

For the starship, I started with lots of sketches to mimic different styles. Such as metallic, organic, old-fashion, sci-fi, etc. After comparing each design of them I realized the sci-fi style was more suitable for my movie. Based on that I drew a more detailed blueprint in Photoshop and added color and texture to it. Then I showed my design to my advisor and committee members, they said the overall shape was good though the texture need to be rougher so it looked like it was homemade instead of factory-made.

Boy's bubble


Top cover (can be opened)
inside the bubble
mechanical feeling surface
(made of metal plates) you can use bump map to de this

Girl's room



3) Storyboarding

Once a concept or script is written for a film or animation, the next step is to make a storyboard. A storyboard visually tells the story of an animation panel by panel, kind of like a comic book.

Before I draw the storyboard, I have to convey some of the following information:

- What characters are in the frame, and how are they moving?
- What are the characters saying to each other, if anything?
- How much time has passed between the last frame of the storyboard and current one?
- Where is the "camera" in the scene? Close or far away? Is the camera moving?

I moved on to the phase of storyboards in the beginning of fall 2011, upon my return to Rochester. Storyboards stage was one of the most important stages in "Bubble Boy" creation process. I intended to use different shots and complex camera angles to play with space. I did every panel of my storyboard in Photoshop. After a rough version was done I sent it to my advisor Bob. He gave me great feedback such as adding in-between shots and close up shots to help tell the story more clearly and make it more interesting too.

4) Animatic

In one sentence, animatic is animated storyboards. I planned to do 3D animatic so I had to start after I finished modeling and rigging. I thought 3D animatic would be much easier to control the camera and perspective.

It took me a long time to finish the whole animatic since I had to do that after character modeling and rigging. At the end of Spring Quarter 2012, I finished the animatic and screened it on SOFA screening. These screenings were very useful because I could get my story in front of a fresh set of eyes and get input on plot, narrative questions and visual development. People on the screening enjoyed the show and gave me great advices.

Part Two: Production

1) Modeling

Characters modeling

Based on the character sheet, I started to model my main character. I like to model humans from a simple cube so I can easily control the whole shape and gradually add detail. Also in the process, I needed to make sure all the normals were facing the same way and that faces were planar to avoid stretching or twisting. There should be enough geometry in the right places so the model does not distort unnaturally when it bends. And also should use only the necessary amount of geometry to define the shape. Clean and efficient models are easy to animate, easy to rig, easy to texture and they render much faster.

early version of the boy

Props modeling

Prop modeling was relatively simple. It took me about two weeks to finish them including the boy and girl's bubble, one blimp, one starship (I spent most time on it) and a couple of indoor decorations. For most tools and indoor furniture I even didn't unwrap UV since I would only put one solid color on them.

2) Shading and Texture

I used MENTALRAY mia_material_x for the cloth and most of props. It is easy to control and always get decent render result.

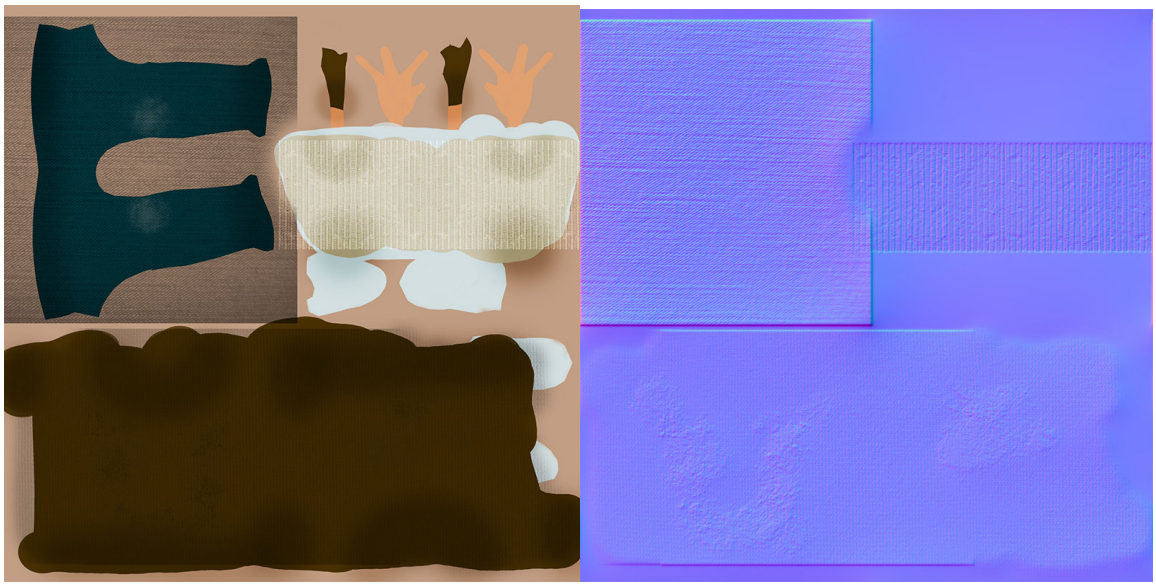
mia_material

The mental ray mia_material is a monolithic material shader that is designed to support most materials used by architectural and product design renderings. It supports most hard-surface materials such as metal, wood and glass. It is especially tuned for fast glossy reflections and refractions.
It has couple of presets to help users easily setting up materials such as wood, metal, glass and water. I used wood preset for the cabinets and tables in boy's room, and used glass preset for the bottles and cups on the desk.
Also, mia_material has a tweakable BRDF(Bidirectional Reflectance Distribution Function) setting to define how reflectivity depends on angle. This setting can greatly improve the render result.

X-Normal

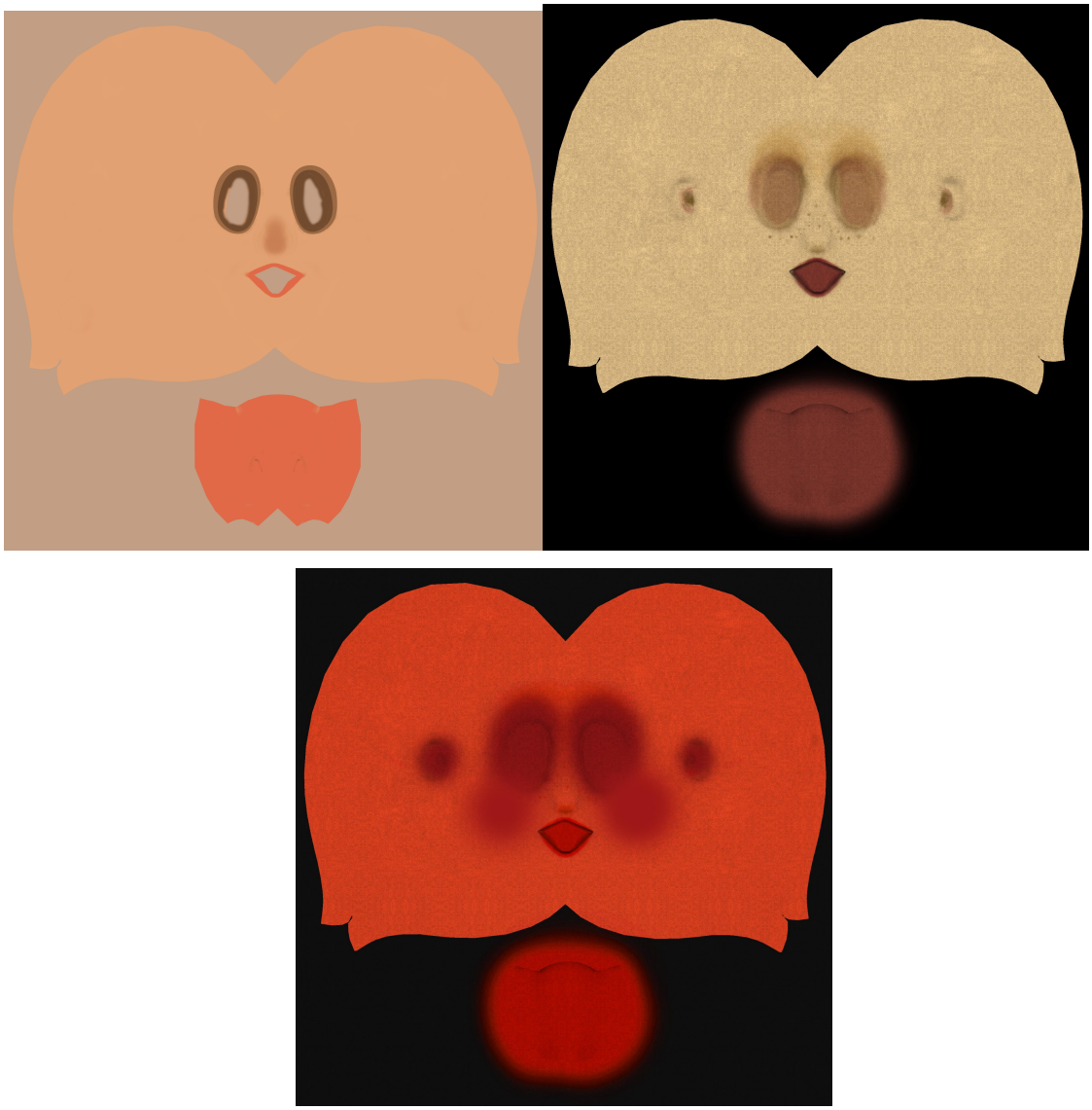
xNormal is an application to generate normal/ ambient occlusion/ displacement maps. It can also project the texture of the highpoly model into the lowpoly mesh (complete texture transfer, even with different topologies). It includes too an interactive 3D viewer (with advanced shaders and realtime soft shadows / glow effect), some Photoshop filters and importers/exporters for 3dsmax and Maya.
I used X-Normal to generate normal map for my character. It really saved me a lot of

time.



Mental Ray Sub-Surface-Scattering

I used Mental Ray sub-surface scattering shader for the skin. Subsurface scattering is light passing through and diffusing within a thin translucent material. Human skin is an example of such a material as it is made up of many thin translucent layers. A Subsurface Scattering material is ideal for re-creating skin in 3D computer graphics and is why the Mental Ray Subsurface Scattering Fast Skin shader was specifically created.



S3 texture

The texture maps I used the most are color maps, normal maps or bump maps, specular maps, transparency maps and reflection maps.

final texture for the boy

3) Rigging

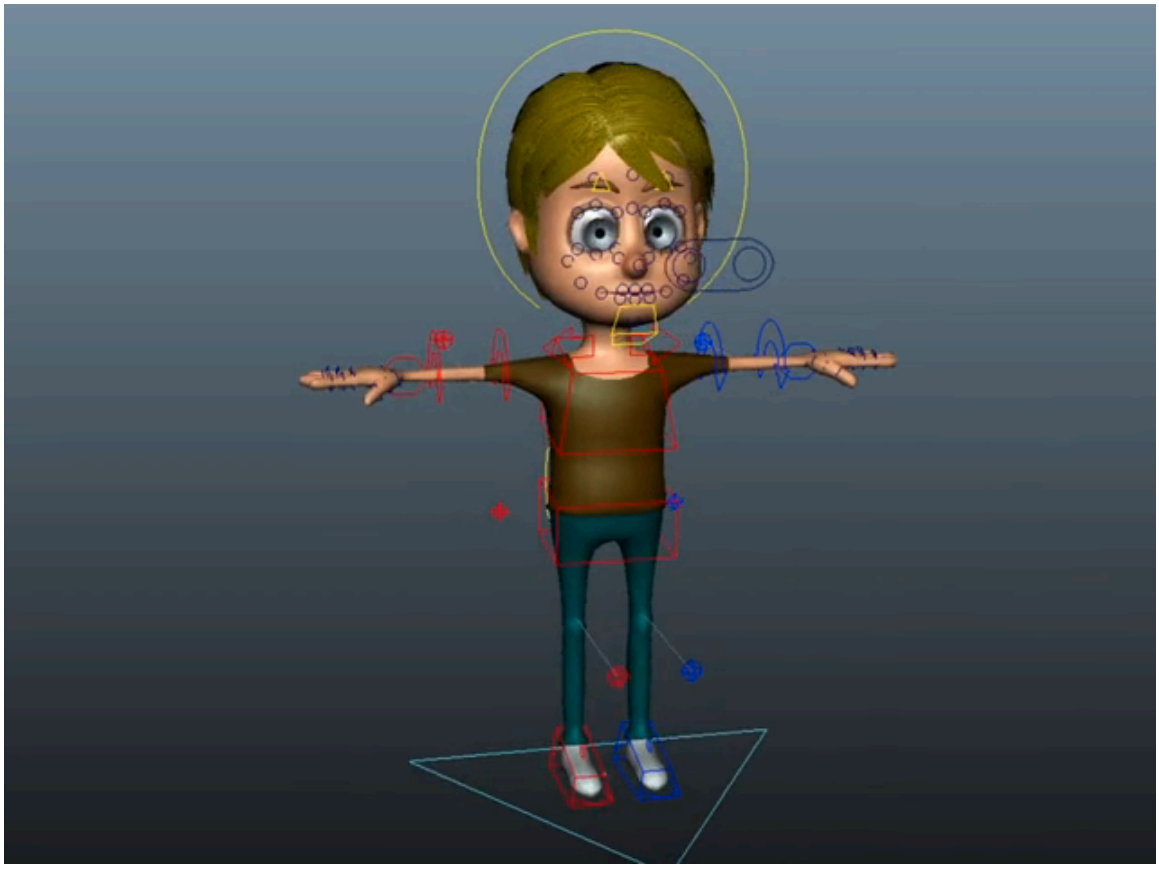
Although for most people rigging is complex and tricky, for me it is really fun.

For the boy's body, I did cartoony style rigging, which included IK/FK switch, stretching arm, spine IK, auto parenting hand.

One problem I faced is that when I was using IK to animate the arm and hand, sometimes the geometry of the arm would twist in an ugly way. It happened on both upper arm and lower arm. In order to fix that, I had to put extra joints on upper arm and forearm, painted weight for them and added controllers to control their rotations.

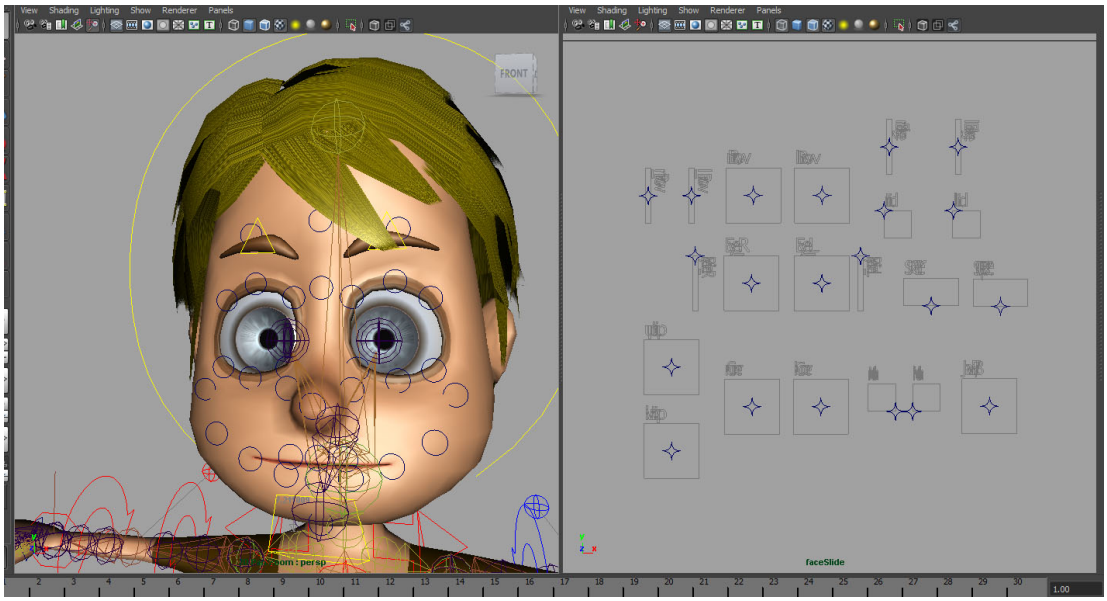
I learned the process by watching Digital Tutor's rigging tutorial. It really helped me a lot.

Based on this rig, I was able to write an auto-rig tool using MEL later.



About the head rigging, firstly I tried using joints but I had no experience with joint facial rigging before. I had a hard time doing this since I didn't know where to place the joints and how many I should use to deform the shape. It ended being a kind of bad rig at the end.

After going through *Jason Osipa*'s book 'Stop Staring: Facial Modeling and Animation Done Right'. I decide to follow the steps he mentioned in the book and use blend shapes instead. I made couple of key shapes for the brow: brows out up, brows out down, brows mid up, brows mid down, brows squeeze, squint. And couple key shapes for the mouth: smile/ wide, narrow/OO shape, upper lip up, upper lip in, lower lip down, lower lip in, frown, sneer, etc. After this I separate each shape to left and right side using a MEL tool and connect them to the original head geometry. At end I designed a custom panel to fully control each blend shape.



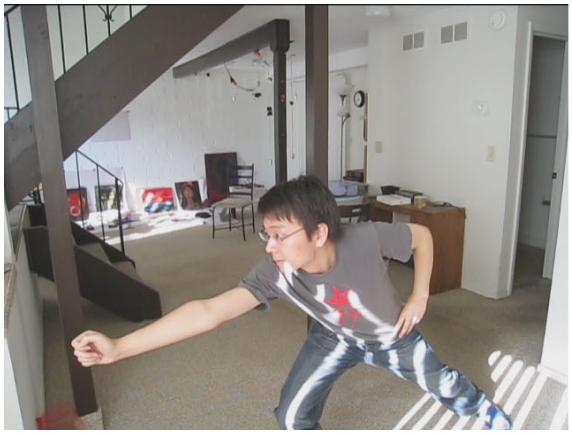
4) Animation

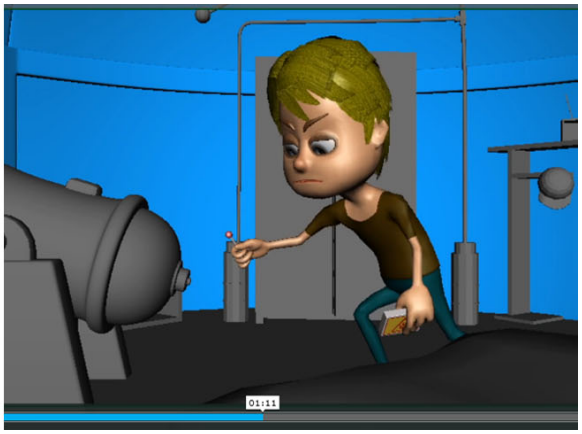
Animation is the process that makes things come alive in the movie. I always keep in mind that the twelve animation principles are essential guidelines to follow when animating in 3D. To keep things organized, I followed process as below when I was in this stage.

Reference and Planning

This is the first step for the animation. Reference and planning are not animation principles, but they are still two very important phases of animation. Researching the actions you are trying to animate will both make the process easier and improve the final product.

While watching my rough animatic over and over again, I was thinking about acting for each scene. Based on the general idea, I recorded the reference video for my character. Most of the scenes were shot at home by myself, except the girl's video which was done with the help of my friend.





Layout animation

This step was relatively simple. For each scene I referenced background, set and character. Then I set render camera, positioned the character.

Although it should be done during the storyboard stage, I did change some camera angles to emphasize the boy's character and make the story more interesting to watch.

Blocking

This is where I settled on the basic poses that I wanted for this animation. I used stepped keys in Maya. It holds the keyframes all the way until the next one and then 'pops" to the new pose in one frame.

After the first pass I added important in-betweens, extremes, and breakdowns to get more definition to the action. Also, I blocked out my moving holds by generally estimating how long I want a movement to take. Again, I added these new keys with held frames with zero in-betweening by the computer.

All this blocking work was really necessary to establish the flow and timing of my animation.

Smoothing

This step was tricky and in my opinion it is better to divide it to different approaches.

First, I switched all my keyframes to linear interpolation. This means there's no ease in or ease out from set keys, it just interpolates from one key to the next in a straight fashion. I had to tighten stuff up after seeing this first linear pass which was too CG.

Second, when I was confident of the poses, the speeding of the transitions, the arcs and the breakdowns, I was ready to start loosening things up. Pose to pose animation can tend to look stiff and robotic. So I need to apply 12 rules to let my character breathe and live some more. I offset keys for each part of the body especially for spine chain, and allowed the arm to have a sort of unfolding overlap. Other than that, I just looked at the preview over and over again, adjusted the controller based on my eyes and experience.

Third, I switched fCurves from a straight linear interpolation to a spline interpolation. What this was going to do was really smooth out a lot of the remaining jerkiness of the animation.

Final touch

The animation of the body is pretty much done here. Still, I would like to go in and tweak it more since I still didn't like some parts of it.

I went through each control object and delete select keys in the middle of curve transitions to make things smoother. Generally if I want to loosen things up even more I'll do it in the fCurve editor by deleting some frames along the curve that are hitching the motion a little bit.

5) Lighting

'There's nothing quite like turning a gray-shaded model into something that looks real – or that could be real.'

3-Point Lighting

Perhaps the most commonly discussed and applied lighting technique is 3-point lighting. Since it is a reliable way to light many scenes, I used it for my main character.

In the standard 3-point lighting scheme, a strong key is placed to one side of the subject. A fill light is placed on the opposite side and is at least half the intensity of the key. A rim light is placed behind the subject so that it grazes the subject's edge.

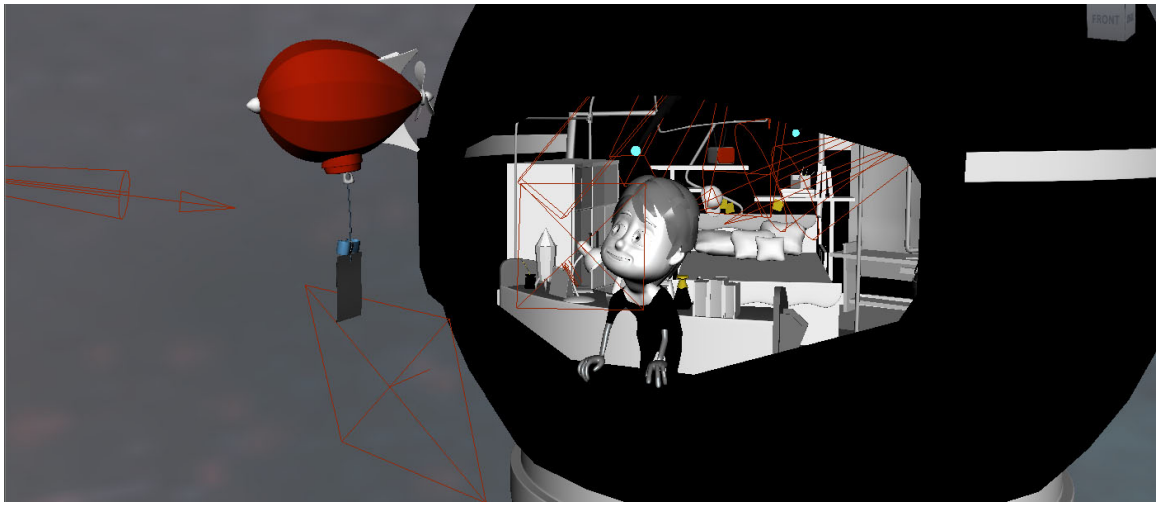
Area Lights

I had used many area lights to light my background and props in my indoor scenes. Area lights are physically-based lights that emanate from a confined, flat area. It is a great way to re-create fluorescent lighting fixtures, strips of neon light, and dense banks of incandescent bulbs. Considering the boy's room, there are four flat neon lights on the ceiling which are the main light source in the scene. Area lights are ideal for this situation.

Area light possesses decay that is affected by distance and angle. Also, it had a great rendering result of blur shadow. Both features applied very well in my film.

Light Fog

I tried to use Maya light fog first but it didn't show up in the Mental Ray. So I ended up with using volume primitives. It was really easy to set up and usually brought solid rendering results.



6) Special Effect

Smoke, Spark, Explosion

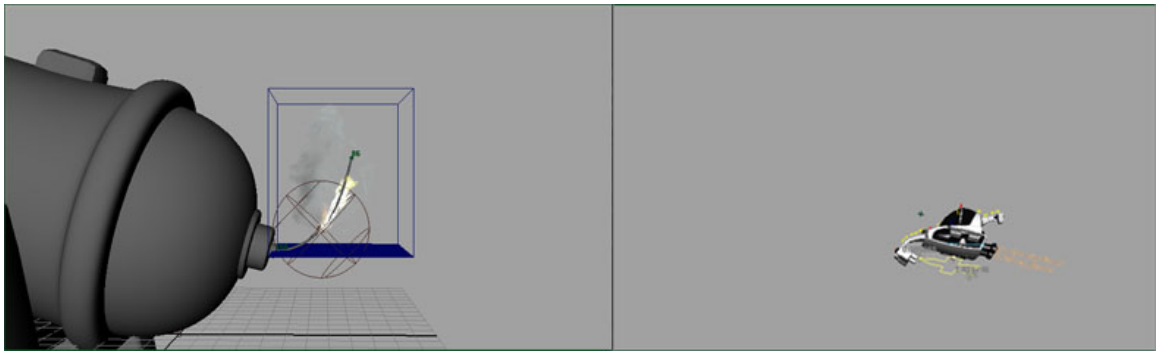
The smoke, spark and explosion effects were made using MAYA dynamic and particles. Considering my cartoony style and limited time, I didn't think it was necessary to make the effect as realistic as possible. So I just used very basic settings. My classmate Xiaoyu helped me to do this part of work and I was very pleased with the results. Though one thing I need to fix is that in one scene Maya rendered the dynamic manipulator by accident.

Blimp Dynamic

Setting the blimp dynamic was difficult during the production. There was supposed to be a string connected to the bottom part of the blimp tied with a bow. Below that there was a ribbon stuck with a love letter. During the movement of the blimp, all the parts were to move dynamically.

I solved the problem with the help of MAYA dynamic curve and follicles. It really took a long time for me to set up the whole system since it was my first attempt with

dynamics. From this experience I know Maya hair is really a great tool not only to make realistic dynamic hairs but also to set up complex rigs.



7) Rendering

In my view rendering is the most annoying stage in the CG pipeline. There are always so many unexpected problems, even if you think you have checked every setting in the scene. At times I forgot to choose the right camera, sometimes the render resolution was wrong, sometime the objects were invisible for rendering. In one scene there was an invisible table which made the final image so funny. I decided to enjoy the mistakes because that is part of our life.

Besides that, one big problem I faced in this stage is that the rendering time is extremely huge even if I put them on render farm (it seemed like it would never finish). I checked render log and found out the rendering engine couldn't find the connected lights to the geometries with Mentalray mia material on them.

I didn't understand what this meant until I found someone from CGtalk who had the same problem. And luckily one veteran gave me a likely reason. You have some hidden lights linked to objects with mia shader. I tried to delete all the hidden lights in my scene and the problem had been solved.

Render Passes

Render passes are a metaphor for an analogous computer graphics process in which several coherent shots are produced, and subsequently combined using image compositing tools. Maya render passes are typically rendered simultaneously, which helps make it a computationally efficient process.

I set up three render layers for each scene: color pass, AO pass and Z Depth.

- Color pass:

Rendered all objects with their textures and lighting in the scene. This is the fundamental for the postproduction.

- AO pass:

Ambient occlusion is a global method, meaning the illumination at each point is a function of other geometry in the scene. The soft appearance achieved by ambient occlusion alone is similar to the way an object appears on an overcast day. (From Wikipedia)

There are two main choices when using Ambient Occlusion: you can enable it as an effect in your shaders (using mia_material), or you can render a separate pass which you blend with your render in the compositing stage. I am using the second way for my animation because it's quicker to tune my AO effect since rendering an OA-pass is typically pretty fast. Furthermore it allows more artistic freedom: I can fine-tune the AO effect during compositing (in After Effect).

- Z Depth

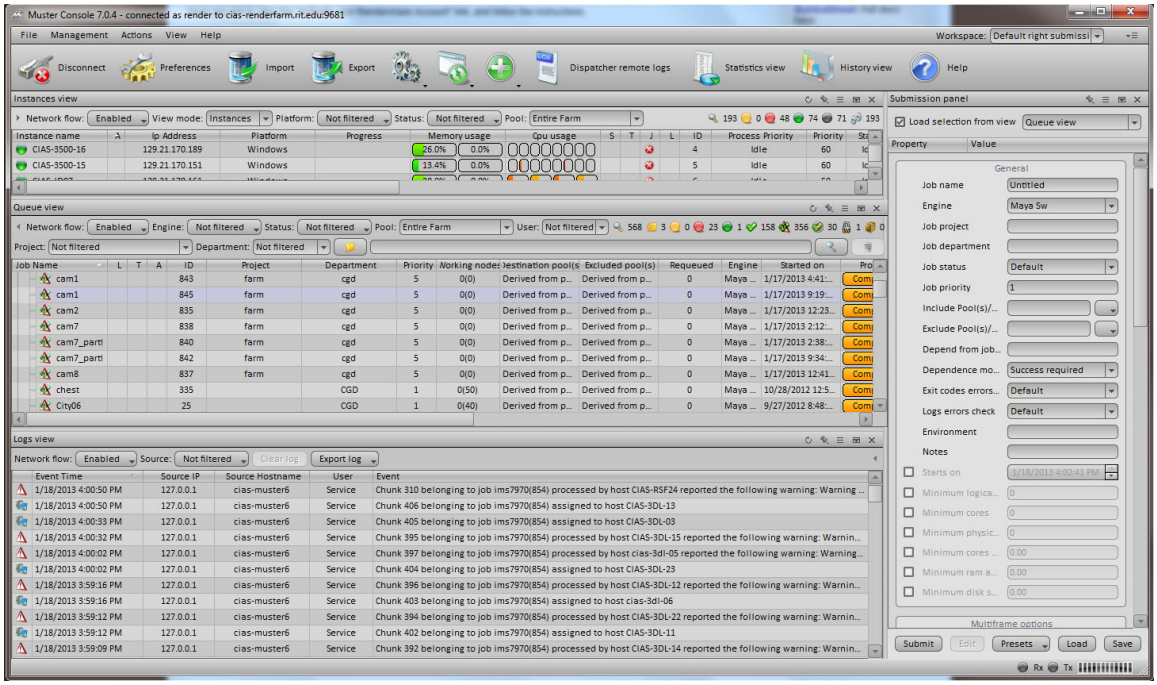
Z-depth is a single channel image, being limited to 256 shades of gray in a standard 8-bit/channel image. It is common to render a depth pass as a 16-bit image to increase the value range and accuracy within a z-depth image. The gray values within a depth pass represent distance from the camera where white is near and

black is far.

In the postproduction, I used Z-depth to add depth-of-field and fog to the background.

Render Farm

It's really lucky that we have an awesome render farm at SOFA. It saved a lot of render time for me.



7) Linear Workflow

A linear workflow is necessary for photorealistic rendering because any output display (for example, a monitor) has a signature response curve that affects the way color is displayed. As a result, to produce color that appears correct to the human eye, a color correction has to be applied to an image. Therefore, you must reverse this color correction before lighting and rendering so that rendering calculations

can be made with the correct color values, and then color correct the resulting image again before it is displayed, so that it appears correct. This results in much more realistic lighting and compositing with greater falloff and softer highlights.

In order to set up linear workflow in Mentalray in Maya, there are two steps as follow: First, make sure all input colors are linear by applying a 0.455 gamma correction to 8-bit images and color swatches. Second, Do all preview renders with a lens shader with a 2.2 gamma correction.

It was my first time setting up texture, lighting and rendering in linear workflow. Although it seemed unnecessary for a student film, I found it was much easier and accurate to control the color by using this.

Part Three: Post-production

1) Compositing

Compositing is the term for merging multiple images that come from different sources.

After rendering all my scenes, I got three passes including color, Ambient Occlusion and Z-depth for each scene. I put them all together in After Effect in the right order and layer settings.

Light wrap / Edge Blur

Light wrap and Edge blur are popular ways to mix foreground and background in order to improve the final image. Technically speaking, the light wrap enables the edge or alpha channel of the keyed item to include some of the pixels from the background element so that it starts to look as if the two items really belong together. So in this way the edge of the foreground will be softer.

In my film, I applied light wrap and edge blur to the scenes when the boy is driving the starship in the universe.

Color correction

Color correction is the process where every clip is manually tweaked to get a good exposure and balance of light.

Generally I used an adjustment layer with the following filters assigned: Curves, Hue/Saturation. The main principle for my film is to maintain the general color feeling for each scene the same. Also I tried to add a little contrast to make the footage more interesting and appealing.

2) Sound FX, music design

My composer was Lucas Gonzalez who is also an animation student at RIT. I saw his one-quarter film “Under Pressure” during the RIT Sofa screening in spring 2012. He did great work in that animation, especially on the soundtrack. I thought that his style of music composition would be a great fit for my comedy.

I gave him the time-lock of my animation three weeks before the deadline and he sent me a sample in one week after that. When I first heard the music with my animatic, I felt like it went through very well with the images. The melody built up based on the storyline and the main character’s emotion over the three minutes. It really supported my animation instead of fighting it.

I started adding sound FX two days before the final day. Most of the sound effects were found in the SOFA sound library. I recorded the boy’s voice in the Foley room. My friend Xin Yin did the girl’s scream.

3) Credits

I began my credits on the last week of the production. I got help from my friend Rene for credits illustration. She came up with a nice and blackboard style image of the boy, the blimp, the girl’s bubble, and the bird. It worked in my favor since it was fitting my film’s cartoony style and would not distract the audience from the main image of the film.

4) Learning experience

During the past year on this thesis project, I started from brain-storming, pencil sketch of concept, to storyboard, animatic, the modeling, texture, rigging, lighting, and finally went to compositing and sound design stage. I am pretty happy to get the result I expected at the end, but at the same time I feel I could even do better.

I realized that in order to create a great personal short film the following aspects are very important: first, setting real goals on preproduction stage. Usually people expect more when they are making plans. But it is not a good thing considering the lack of people and the limited time. Second, time management. I always remember the words from my one-quarter advisor: 'don't think you have 10 weeks to finish your short, think you only have 10 days'. Time always goes by faster than you think. Thirdly, making good friends. Without the help of my classmates I was not able to finish my film. They gave me invaluable help when I was struggling with having fallen behind schedule.

Also, among all the findings I discovered some skills I thought I lacked before. For example, I always feared to do animation, which is noticeable in my two-quarter film *Onion Love*, where I used simple character with simple squash rigging. The animation in that film was too robotic and uninteresting to watch. I am proud that in my thesis film I made a more complex rig for a more complex character and was able to finish all animation in a relatively solid quality.

Overall, I got a better understanding of the film production, improved a lot in all aspects of it, and remembered all the failures and success. I will greatly treasure this experience in my future career.

Part Four: Appendix

First Proposal

Working title: "Ladder"

Synopsis

LADDER is a symbolic film, which indicates that our life cycle is just like climbing a long ladder. Sometimes we try to reach the higher level of the ladder; sometimes we are confused about our position and why we need to keep climbing; sometimes we just get tired of such a tedious process…

Treatment

The camera moves upward through billowy clouds. As the scenery becomes clear, we see a ladder move across the camera. Then a boy (named T) climbs the ladder. He stops, hesitates, looks around, and then takes out binoculars. From his perspective we see the big ladder extend very far into the clouds. He packs up the binoculars and continues climbing.

An old man comes out and sits on one step of the ladder. He drinks a cup of water, looks downward and smiles to T. He asks T if he wants some water. T shakes his head and climbs across the old guy.

As he climbs the scenery changes. He sees another ladder beside him. A young man stands there doing something strange: he uses a saw to cut one piece of the ladder above, then attaches it to the ladder below. He keeps changing it, so he gradually changes the route of the ladder.

T, the young boy, now appears to be a young man. He climbs to an intersection where two ladders join up. A group of five young people are climbing from the other ladder, crossing the intersection. One woman follows one man; another man follows the woman… Sometimes the person below touches the other person's pant leg, aggravating them. When the last woman climbs across the ladder, above T, T also touches her pant leg. That young lady turns her head, Smiles mysteriously, and then goes away like others.

T now appears as a middle age man. He climbs to an intersection. There are three different ladders above. Each of them has different textures and shapes. By looking through his binoculars he finds every ladder extends in the distance. He stops, hesitates, unable to decide which way to go.

Finally T appears as an old man. His speed slows down. For one moment he stops to have a rest. He sits on one step of the ladder just like the old guy he saw when he was a boy. He takes a sip of water, smiles to the camera; and then shakes the bottle to the camera. When this happens, the camera zooms out to see the whole world. The entire world is made of a lot of ladders. Each ladder is wrapped around the globe in a circular shape. The ladders collectively combine to become a sphere. END.

Technique & Style

This film will be a 3D animation combined with 2D background. All the characters and props will be modeled and textured in MAYA. Animation will be done in MAYA. The mysterious background will be hand drawn in a watercolor style. The clouds and other environment elements will be added in AE.

I want the style to be simple but effective to show the strange world. One of my influences is the work of Kunio Katô's (http://en.wikipedia.org/wiki/Kunio_Katō). Ideally the style will be similar to his.

Budget

	Descript	Fee
Pre-Production	Story and Script	0
	Character Design	0
	Animatic	0
	Storyboard	0
	Research and Development	0
Production	Modeling	0
	Texturing	0
	Rigging	0
	Background Design	0
	Animation	0
Post-Production	Composing	0
	Music Composer	150
	Foley Artist	100
Office	Duplication	50
	Shipping	40
	Festival Fees	150
Contingency		50
Total		540

Second Proposal

Working title: "Math vs Boy"

Synopsis

Math vs. Boy is a comedy animation, which talks about a naughty boy who doesn't want to concentrate in studying math fights with math-notebook-monster in his dream.

Treatment

The camera zooms in in a room. We see a boy study math at the desk. He gets bored and yawns, then looks around. Suddenly a beauty magazine on the other side of desk attracts his attention. He gets excited, tries to grab it, but at the same time he remembers something, looks towards the wall. There is a calendar on that wall which shows there's only one day left for final exam. The boy becomes disappointed, he returns to his study reluctantly. After a few second, he gets tired again, after stretching himself the boy fells into a sleep on the desk.

When the boy opens his eyes, he finds himself standing on the desk and his body shrinks. He looks around. The beautiful girl in the magazine is flirting to him. He feels excited, and then runs towards her, who is on the other side of the table. All of a sudden the math-notebook-monster falls down in front of him, it spits out papers to try to hit the boy. The boy dodges right and left. He keeps moving until he hit a protractor monster. The protractor jumps towards him. Then the boy grabs a pencil and fights with the monster. Finally he uses a set of toy bricks to trap the protractor.

The boy turns his head because he hears some sound backward. That's a big bow compass – the second understrapper of the math monster. The compass leans forward, tries to prick him. The boy gets out of the way, grabs a huge erase to defense. The compass impales the erase, but the erase sticks to one foot of it, which gives a while for the boy to make a plan. The boy finds a piece of lamp cord, grabs the end of it, then takes a circuitous route around the bow compass, at last the bow compass is bounded and defeated.

The boy relaxes a little bit. The math-notebook-monster becomes extremely angry, it spits out a variety of stationery, then jumps into the air, connects with the stationeries, becomes a big human shape monster. The boy looks horrified. But the boss monster doesn't give him much time to react. It keeps vomiting all kinds of math symbols, math stationeries. But all the "bullets" misses the boy. He escapes and hides behind a bunch of books. When he peeps through the edge of books, the boss is missing. At the same time, the monster is approaching the boy from the other side. When he slowly turns back his head, the boss is near at hand. The boy is extremely scared. He shivers, but couldn't do anything. They are just facing each

other for a moment. Then unexpectedly, the monster vomits an exam paper and a pen. The boy is confused at first, then he realizes he should complete the exam paper. After finishing the paper, he hands it to the monster that grades the paper. The answers turn out 100% right. The monster transforms to a normal notebook after that. Finally the boy defeats the boss monster in an unexpected way.

The boy keeps running to the beautiful girl. He feels happy until history-notebook-monster falls in front of him.

Suddenly the boy wakes up and knows all are in the dream. He glances at the beauty magazine, then begins to study frantically because his dream scared him so much. END

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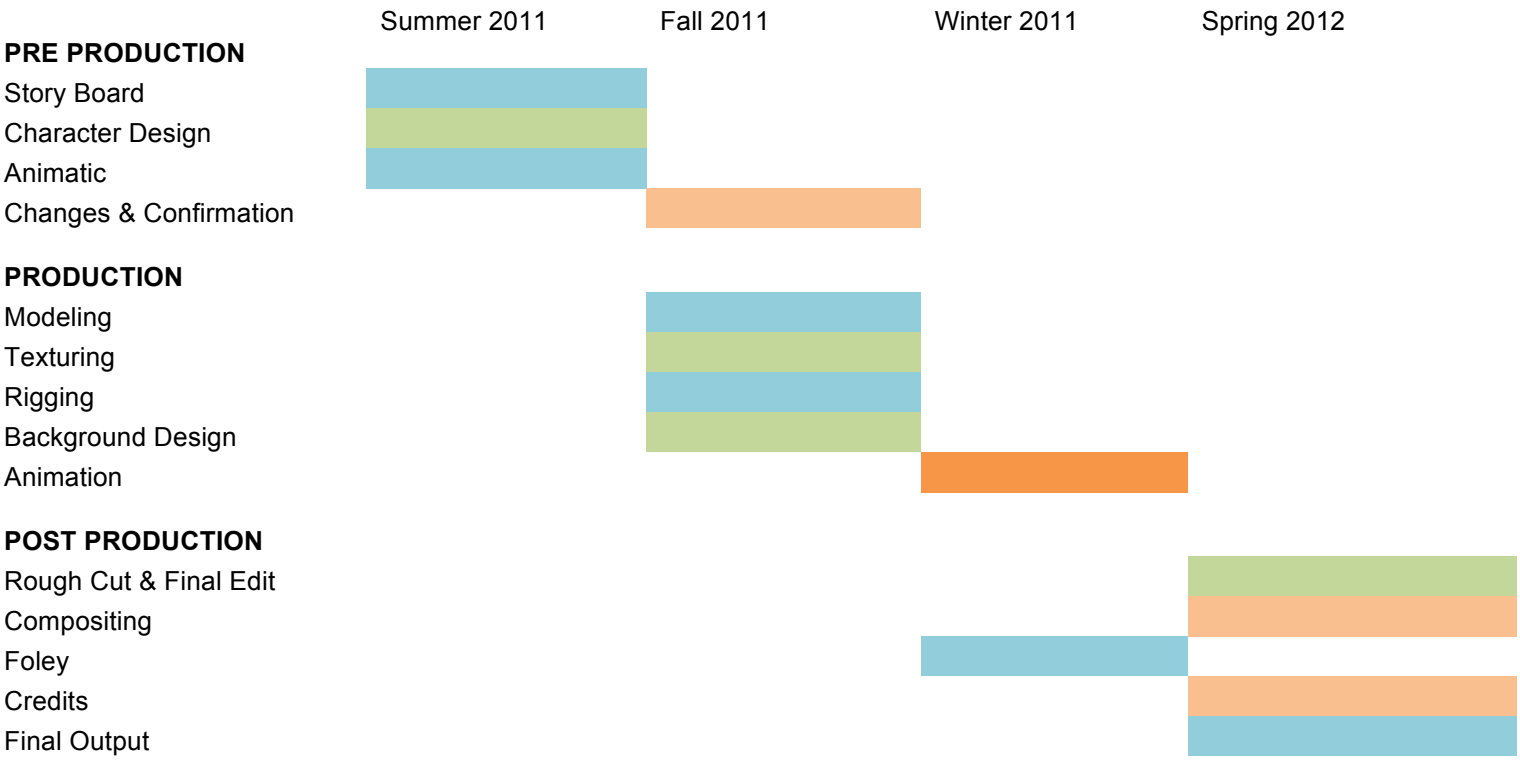
Budget

	Descript	Fee
Pre-Production	Story and Script	0
	Character Design	0
	Animatic	0
	Storyboard	0
	Research and Development	0
Production	Modeling	0
	Texturing	0
	Rigging	0
	Background Design	0
	Animation	0
Post-Production	Composing	0
	Music Composer	400
	Foley Artist	100
Office	Duplication	50
	Shipping	40

	Festival Fees	300
Contingency		100
Total		990

Time Line

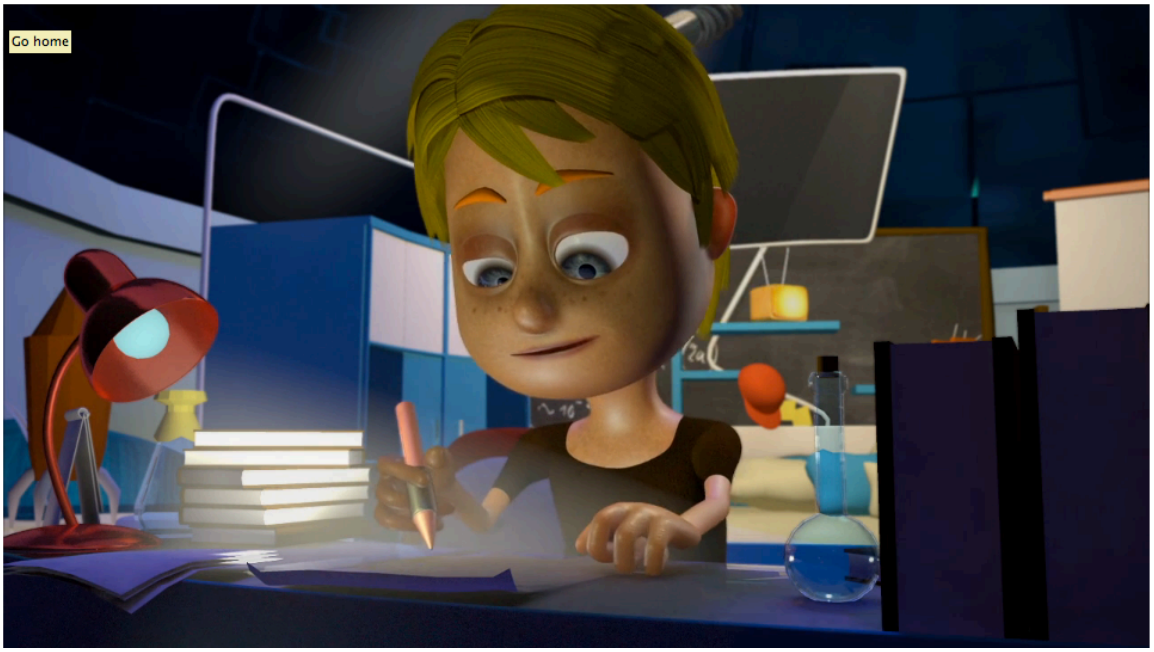


Storyboard


3B
4
5A
5B
6
7A
7B
7C
7D
8A
8B
9
10
11A
11B
12A
12B
17A
17B
18
19
20A
20B
20C
BOOM

Snap Shots


Go home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